

**Construction of Telugu-Ganga Canal in and around two
protected areas in Cuddapah District, Andhra Pradesh, India.
Immediate threat to the world population of the
critically endangered Jerdon's Courser *Rhinoptilus bitorquatus***



Survey Report, December 2005



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Construction of Telugu-Ganga Canal in and around two protected areas in Cuddapah District, Andhra Pradesh, India. Immediate threat to the world population of the critically endangered Jerdon's Courser *Rhinoptilus bitorquatus*. Survey Report.

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Introduction

Jerdon's Courser *Rhinoptilus bitorquatus* is a nocturnal cursorial bird and one of the world's rarest birds found only in Andhra Pradesh, India (BirdLife International 2001). Since it is believed to have a small and declining population, it is categorized as critically endangered in the IUCN Red List (IUCN 2004). The Jerdon's Courser is listed under Schedule I of the Indian Wildlife (Protection) Act 1972, and is considered as priority species under the National Wildlife Action Plan (2002–2016) of the Government of India (Ministry of Environment and Forest, 2002). Very little information is available on the distribution, ecology, population size and habitat requirements of the Jerdon's Courser (BirdLife International 2001).

Jerdon's Courser was believed to be extinct after 1900 until being rediscovered in 1986 near Reddipalli village, Cuddapah District of Andhra Pradesh, India (Bhushan 1986). The area where it was rediscovered was designated as the Sri Lankamaleswara Wildlife Sanctuary. In 2000, its known distribution was a single site a few hundred metres in diameter in scrub jungle near Reddipalli in the Sagileru valley. Since 2000 research conducted by Bombay Natural History Society (BNHS) along with Royal Society for the Protection of Birds (RSPB) and the Universities of Reading and Cambridge, funded by Darwin Initiative, U.K. and supported by Andhra Pradesh Forest Department (APFD), has made considerable progress in developing the standard survey techniques to detect their presence, described the broad habitat requirements and use this information to identify new sites in and around Sri Lankamaleswara and Sri Penusula Narasimha Wildlife Sanctuaries.

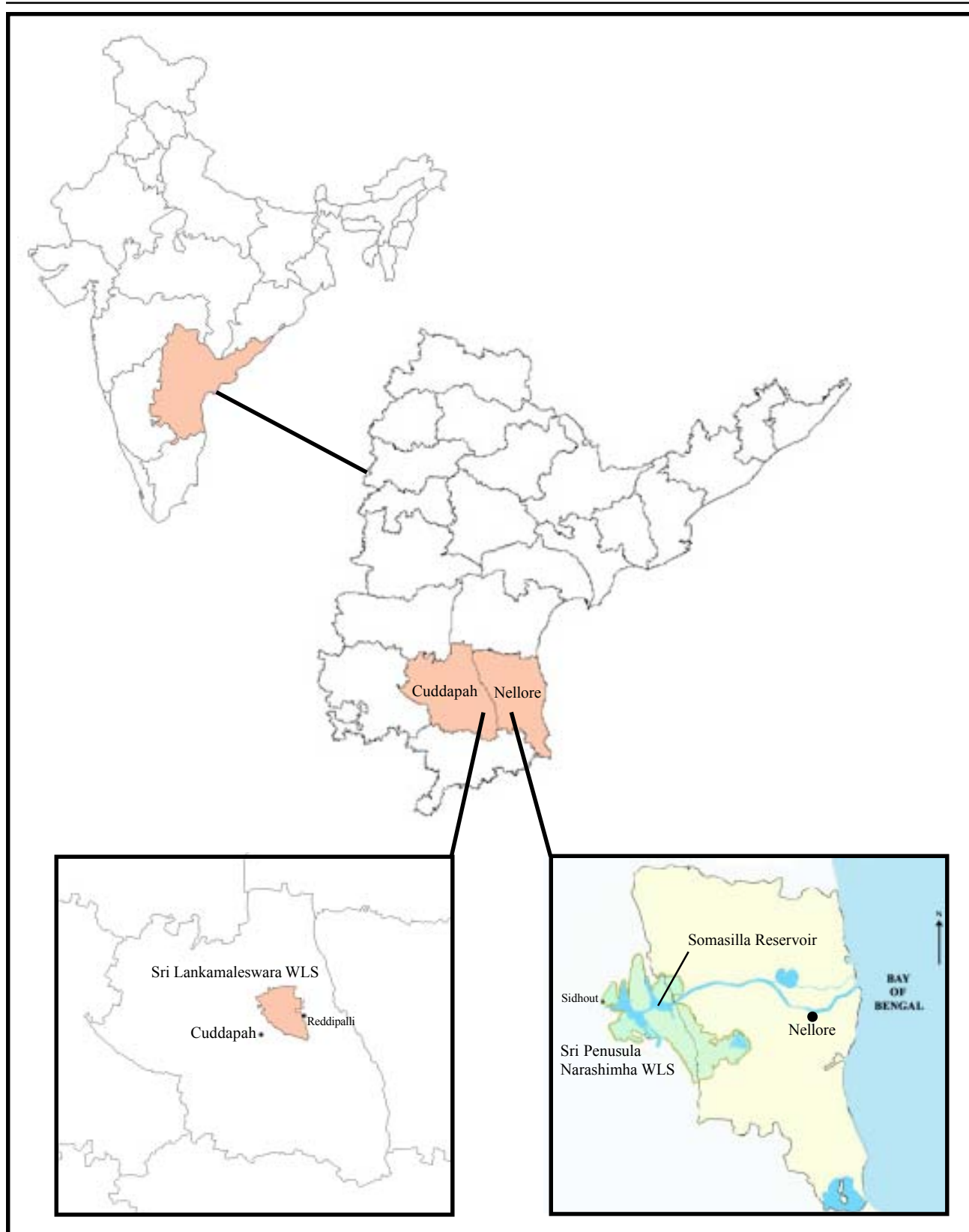
Sri Lankamaleswara Wildlife Sanctuary (SLWLS)

Geographically, Sri Lankamaleswara Wildlife Sanctuary lies between the Nallamalais and Sechachalam hill ranges in the central part of the Eastern Ghats. SLWLS covers 464 km² located between 14°45' to 14°72' N & 79°07' to 78°80' E (Map 1). The sanctuary ranges from about 137 to 784 m above mean sea level in elevation. The sanctuary was bordered in the west by dense scrub and dry red sanders-bearing forest as well as southern dry mixed deciduous forests on the higher elevations of the Lankamallai hills. To the east, agricultural fields, orchards and croplands are found in the valleys of the semi-perennial river Sagileru. This tributary joins the Pennar river, which borders the southern part as well as a part of western side of the Sanctuary.

Sri Penusila Narasimha Wildlife Sanctuary (SPNWLS)

Sri Penusila Narasimha Wildlife Sanctuary (SPNWLS) is spread over in the districts of Cuddapah and Nellore, Andhra Pradesh (14°18' to 14°41' N and 79°05' to 79° 37' E) (Map 1). SPNWLS is adjacent to the Sri Lankamaleswara Wildlife Sanctuary region. This area encompasses Turupukonda hills, part of Velikonda hill ranges, Somasila Dam and Kandaleru reservoir. SPNWLS is divided from the SLWLS by river Sagileru. Main reason to notify this area as a sanctuary is the report of the presence Jerdon's Courser from the foothills of Turupukonda (Bhushan 1995).

Soon after the rediscovery of the Jerdon's Courser in 1986 and after few sightings, this place was proposed as Velikonda Wildlife Sanctuary but



Map. 1. Location of the Sri Lankamaleswara and Sri Penusula Narasimha Wildlife Sanctuaries in Cuddapah and Nellore Districts Andhra Pradesh, India. Map not to scale.

it was declared as a sanctuary only after about ten years as Sri Penusula Narasimha Wildlife Sanctuary. The total area of 1031 sq/km was declared as a sanctuary on 4th October 1997 by the Government of Andhra Pradesh. This Sanctuary as well as the Sri Lankamaleswara Wildlife Sanctuary was recently designated as one of the Important Birds Areas in India (Islam & Rahmani 2004)

Current distribution of the Jerdon's Courser

Ever since the Jerdon's Courser was rediscovered, it has been sighted regularly only at few sites in and around the Sri Lankamaleswara Wildlife Sanctuary. A new method has been developed for detecting their presence by deploying tracking strips upon which the birds leave their distinctive footprints. The identification of the footprints were established by setting up cameras triggered by birds interrupting an infra-red beam to confirm the identity of birds which left tracks. Surveys using this method have detected the species in three new places. But these are all within 14 km of the original rediscovery site (Jeganathan *et al.* 2004a).

Call of the Jerdon's Courser was not known previously and it was recorded and identified recently (Jeganathan & Wotton 2004). Trials of playing a tape recording of Jerdon's Courser calls in suitable habitat within about 1 km of the previously known site during the evening (45-90 minutes after sunset) elicited responses from Jerdon's Courser from nine new places. Also a tape transect survey method was devised to find the Jerdon's Courser in new areas. Following this method, surveys were carried out outside the known area in potentially suitable habitat in and around

the Sanctuary. Tape playback was carried out at 421 points. These points were surveyed once and the Jerdon's Courser responded at three points. More details can be found regarding the soil strip and tape playback methods in Jeganathan *et al.* (2004b).

There are few sight records of Jerdon's Courser from the western slope of the Turupukonda foot hills in the Cuddapah forest division of the Sri Penusula Narasimha Wildlife Sanctuary way back in 1986 (Bhushan 1995).

Other than these sites from the Cuddapah district there were no recent records of the Jerdon's Courser from Andhra Pradesh though historically it has been reported from Khammam, Nellore, Anantapur districts and from a place called Sironcha, in east Maharashtra.

Preferred habitat of the Jerdon's Courser

So far the Jerdon's Courser was reported mainly from the scrub jungle habitat. It mainly inhabits sparse, scrub-forest interspersed with patches of bare ground, in gently undulating, rocky foothills (Bhushan 1986). Recent study carried out in and around the SLWLS show that Jerdon's Coursers have a strong preference for a particular density of scrub jungle habitat and are most likely to occur where the density of large (>2m tall) bushes was in the range 300-700 ha⁻¹, and where the density of smaller bushes was less than 1000 ha⁻¹ (Jeganathan *et al.* 2004a). Jerdon's coursers also seem to prefer areas where there are woody plant species, such as *Hardwickia binata*, that are characteristic of mature scrub which has not been subjected to major disturbance, such as clearance, for a long time (Jeganathan *et al.* 2004a).

Threats and conservation issues

The major threat to the persistence of Jerdon's courser is the loss and degradation of scrub forest within which it lives, due to habitat conversion to agriculture, and the inappropriate use and management of scrub forest (BirdLife International 2003). The clearing of scrub forest by people, overgrazing with livestock and probably under grazing too, are all likely to cause deterioration in habitat for the species (Jeganathan *et al.* 2004a). Since 2001, disturbances for the scrub jungle area in and around the Sanctuary area were documented. An estimated area of 332 ha forest was cleared of which 85 ha of the scrub jungle which is potentially suitable for the Jerdon's Courser, had been cleared to provide land for agriculture to the people who were displaced by floods, and also for lemon farming. These cleared places fall within about 1 Km from the previously known as well as newly detected Jerdon's Courser areas (Jeganathan *et al.* 2004b).

Construction of Telugu-Ganga Canal and Jerdon's Courser habitat

At the time of the rediscovery in 1986, the Jerdon's Courser site was under threat because it was planned to construct the Telugu-Ganga canal across it. Officials from the Forest Department and the State Government of Andhra Pradesh recognised the ornithological importance of the site and declared it as the Sri Lankamaleswara Wildlife Sanctuary for Jerdon's Courser, which includes the rediscovery site on its eastern fringe, and caused the proposed course of the canal to be adjusted to avoid the Sanctuary (Bhushan 1995).

Recently the canal construction was started for irrigating the lands in the Sagileru River valley. During the last week of October 2005, from

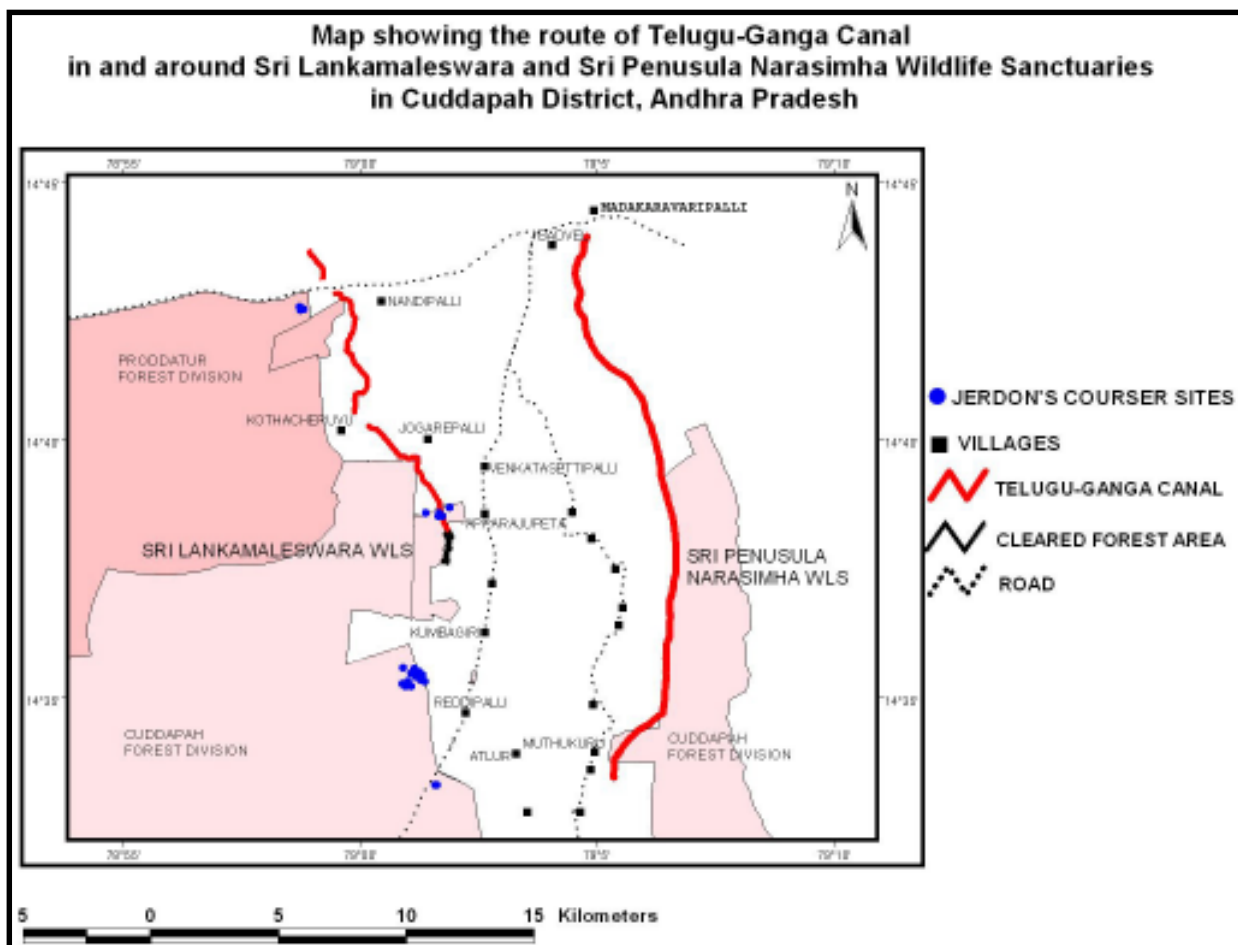
Venkatasettipalli in the Siddavattam to Badvel main road, excavating machinery in the scrub jungle near Sri Lankamaleswara Wildlife Sanctuary was noticed. Visits to that site revealed that it was the excavated Telugu-Ganga canal. Immediately this was brought to the notice of the Divisional Forest Officer (DFO) in Cuddapah, as well as to Additional Principal Chief Conservator of Forests, Andhra Pradesh Forest Department (APFD) in Hyderabad. Prompt action taken by the APFD resulted in stopping the canal work on 23rd October 2005.

The origin of the Canal is from Sri Potuluri Veera Brahmendraswamy (SPVB) reservoir near Bramhamgarimatam. This canal come southwards and end 2 km away from Nandhipalli near Badvel - Mydukur road. It is also referred as Right Canal. Apart from this one more canal is being excavated from Madakaravarapalli which is c 1.5 km from Badvel. This canal goes southwards to the east of Sagileru river and it goes along the western boundary of Sri Penusula Narasimha Wildlife Sanctuary (Map 2). This part of the sanctuary falls under Cuddapah Forest Division. This canal is referred as Left Canal.

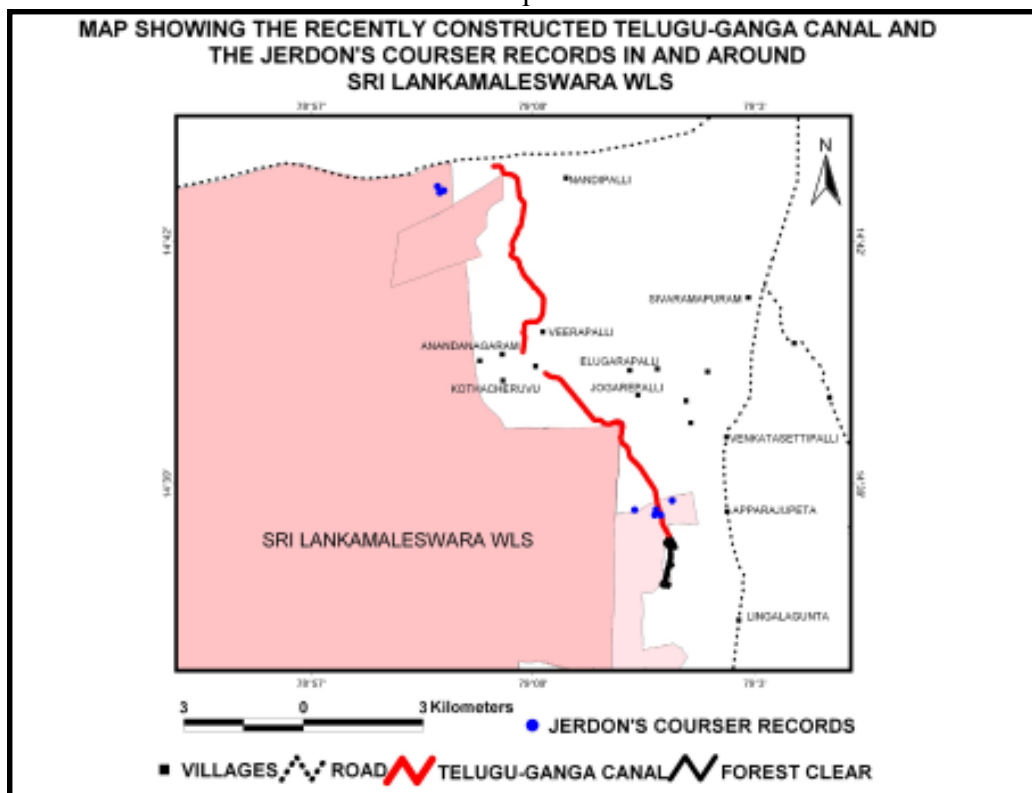
Mapping and documenting the canal route

Potentially suitable habitat of the Jerdon's Courser was mapped with the help of georeferenced Landsat 7 Enhanced Thematic Mapper satellite imagery of the study area (path/row 143/050) for 6 December 2000. A preliminary habitat suitability map was produced and kept as an overlay on the imagery to find out the extent of the suitable habitat. The canal route and other disturbances were mapped from 21st to 28th November 2005.

Map. 2



Map. 3



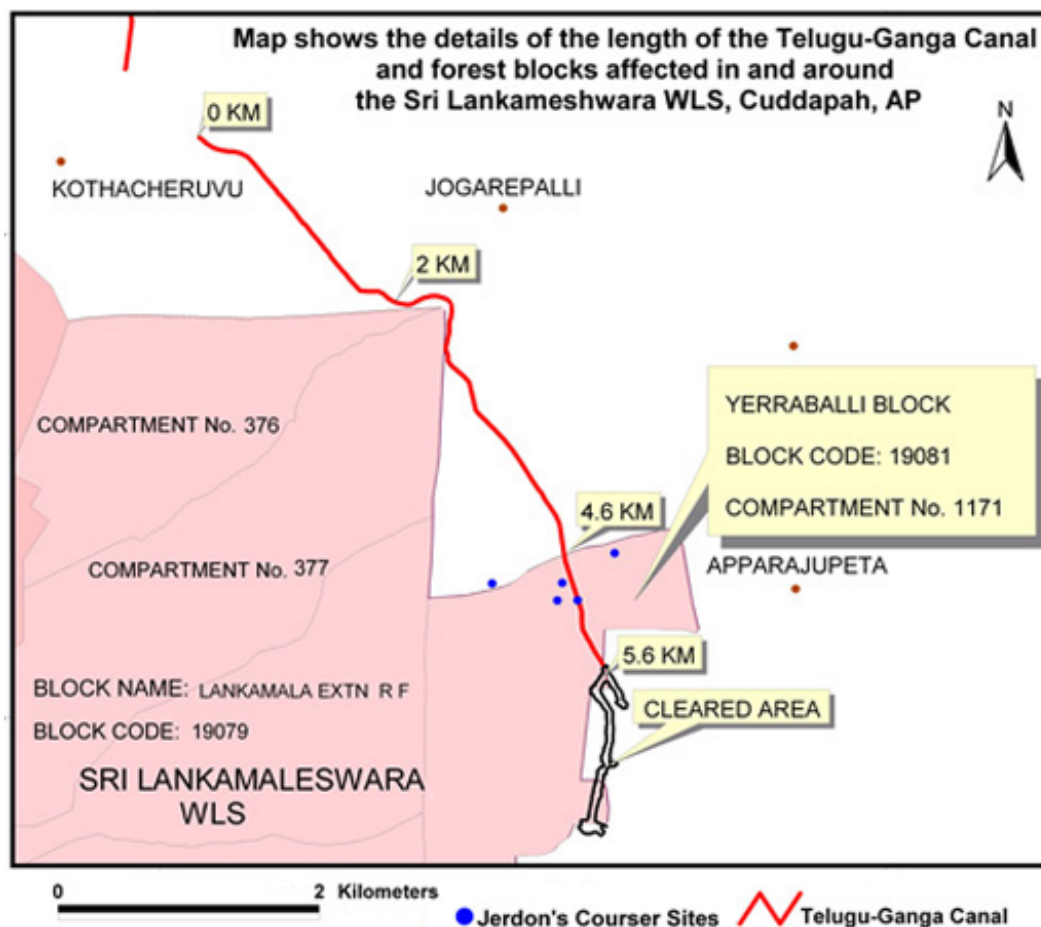
Canals were about 16 to 20 m wide. But the area cleared for preparing this canal differs from 80 to 100m. Stones and the soil was dug up and piled all along the canal route. Roads were constructed on either side of the canal by using this soil as well as soil dug up from the near by area. Trees and shrubs, which are on the path of the canal route, were uprooted and thrown aside. Canal was mapped by driving the jeep and/or walking through this road with the help of GPS (Garmin eMap).

Extent of the area cleared was mapped by walking along the edge of the cleared areas with GPS. Map of the cleared areas was kept as an overlay on the imagery to find out the extent of the loss of suitable habitat. This was achieved with the help of GIS software's Arc View 3.2a and ERDAS image 8.5.

Right canal near Sri Lankamaleswara Wildlife Sanctuary

The Right Canal comes southwards from SPVB reservoir and ends 2 km away from Nandhipalli near Badvel - Mydukur road (Map 3). The total length of the canal upto this point is c.22 km. Canal excavation continues from the other end of the road for about 5.8 km till a place called Anandanagaram. It was learned from the local people that the canal was stopped there mainly because the owner of that land did not allow the construction since the compensation was not paid. The canal excavation continued again leaving the gap of about 800m from the previous canal. This goes for about 5.6 km and stopped inside the Yerraballi Forest block, Sidhout Range, Cuddapah

Map. 4



Forest Division. After 2 km from the starting point, it goes all along the Sanctuary boundary for about 1 km. After about 4.6 km, it enters into the Yerraballi Forest block and passes through the block for about 900m (Map 4 & Plate 1). Apart from this canal, forest area has been cleared for the construction of the canal in and around Yerraballi Forest Block. Total length of this clear is c.1.6 km.

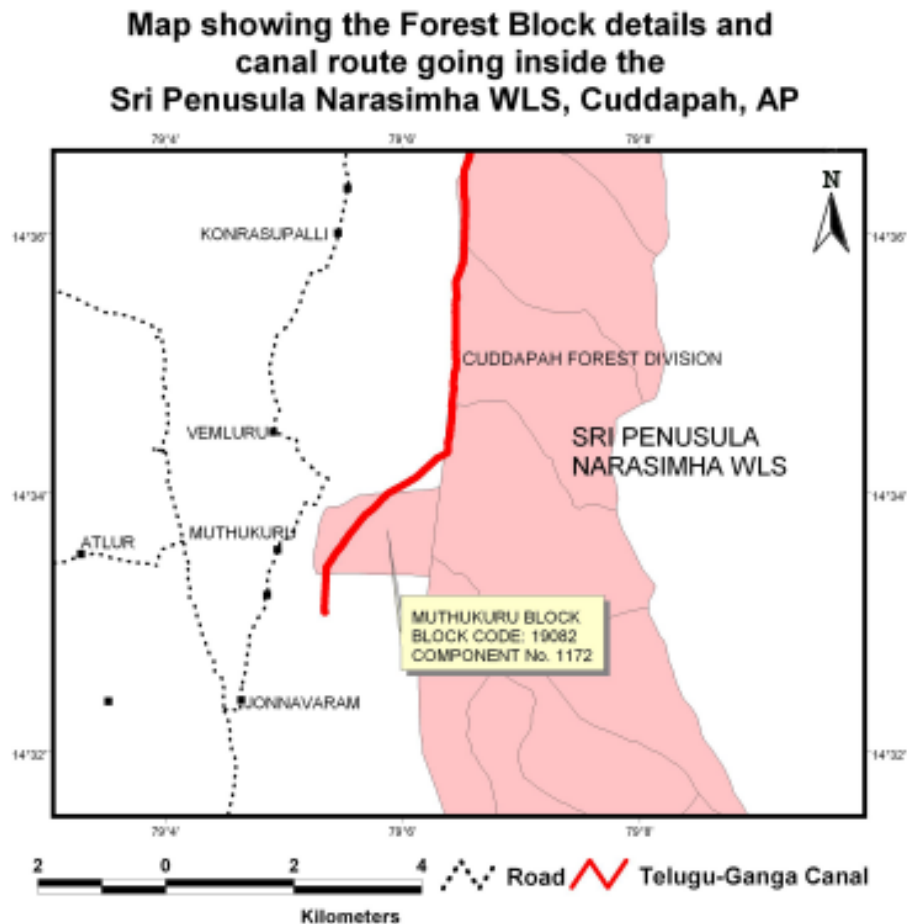
Left Canal near Sri Peninsula Narasimha Wildlife Sanctuary

The Left Canal excavated from Madakaravarapalli goes southwards to the east of Sagileru River and it goes along the western boundary of Sri Peninsula Narasimha Wildlife Sanctuary. Total length of this canal from

Madakaravarapalli is c. 23 km. The canal goes very close to the Sanctuary boundary. In some places forest has been cleared and roads were made inside the Sanctuary area. Also in many places forest cairns have been damaged (Plate 2). Finally the canal comes to an end near the place called Muthukur. While the canal reaches its 21st km it entered Muthukur Forest Block of the Sanctuary area which falls under Sidhout Range, Cuddapah Forest Division. Length of the canal construction inside this Forest Block is about 2 km (Map 5).

It should be noted that since the construction was done without obtaining the permission from the APFD, it was stopped by the Cuddapah DFO and concerned persons were arrested on 25th October 2005.

Map. 5



Impact of the canal on the Jerdon's Courser habitat

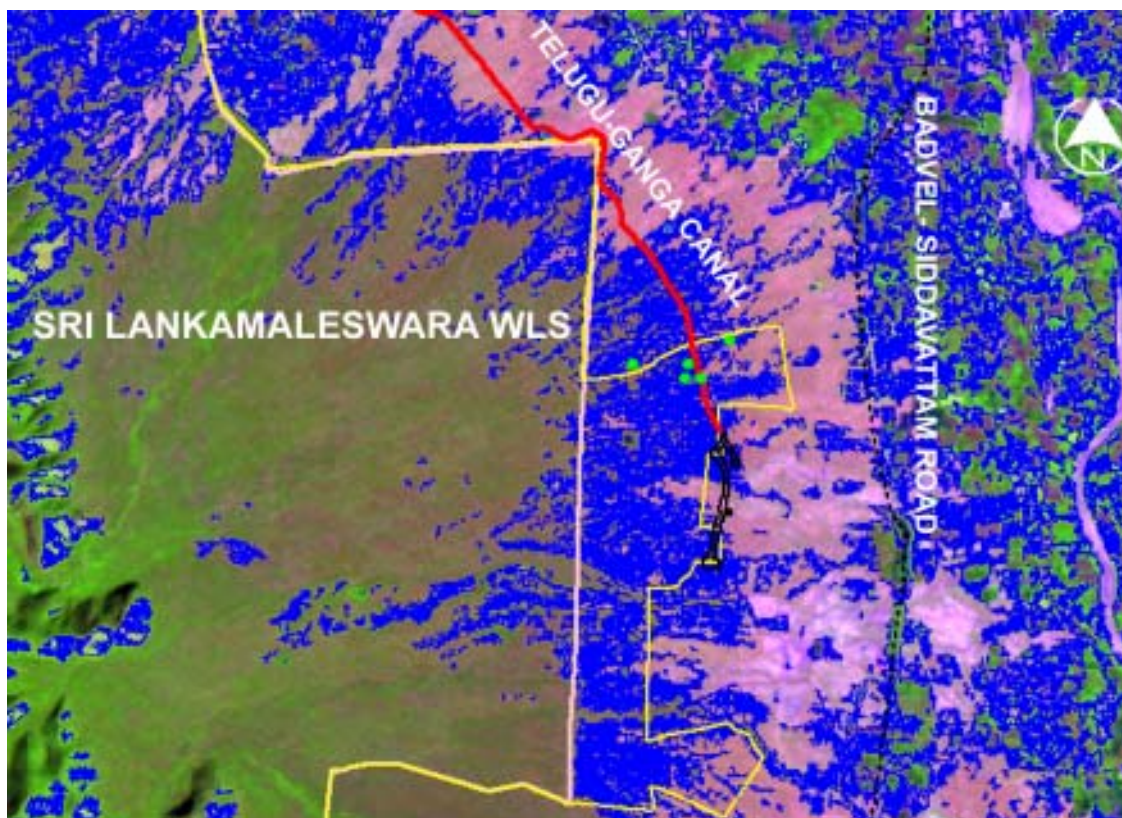
Extent of the Potential Habitat of the Jerdon's Courser in the eastern part of the Sri Lankamaleswara Wildlife Sanctuary

Scrub jungle with open areas which is suitable habitat for the Jerdon's Courser found mainly around the eastern part of the Sanctuary. This habitat is found as a strip of land at the foot of the eastern slopes of the Lankamalai Hills running from Badvel-Maidukuru road in the north to the Pennar River in the south. Based on our studies (Jeganathan *et al.* 2004a) we estimate that about 3600 ha was potentially suitable for the Jerdon's Courser. The area of the sanctuary

near Reddipalli from which all recent confirmed sight records have been obtained comprises less than 100 ha of this. More importantly, most of these places were found outside the sanctuary limit and the only Forest Block having most of the suitable habitat is Yerraballi Forest Block (443 ha). Suitable habitat extends outside the sanctuary border upto 1-2 km in the eastern part (Map 6). Note that agricultural areas and forested hills also classified as suitable due to the similarity of the reflectance values of these features to that of the scrub jungle habitat. Survey of India Toposheets was verified to find out the suitable habitat. Refer Jeganathan *et al.*, 2004b. for more details.

Area estimation

Canal route was mapped by driving the jeep and/or walking through mainly from one side of



Map. 6. shows Landsat 7 ETM image of the study area with the preliminary habitat suitability map overlaid onto it. Note that extensive favorable habitat (in blue color) for the Jerdon's Courser found in the Yerraballi Forest Block. Green dots indicates Jerdon's Courser records and Black line indicate the cleared forest area.(Map not to scale).

the road with the help of GPS. The width of the area cleared was 80-100m and it varies from place to place. This was visually estimated and also measured in few places.

Tracks of the canal route and other coordinates marked in the field were downloaded from the GPS into the computer. With the help of ERDAS Image 8.5 software tracks were transformed as Arc coverage. On the screen simulated lines had drawn either side of the canal tracks for not less than 40m to mark the width of the area cleared. This was made as a polygon and the area was obtained. It should be noted that area falls inside this polygon have different kind of habitats such as open ground,

rocky terrain as well as scrub jungle. This coverage was kept as an overlay on the habitat suitability map of the Jerdon's Courser to find out the habitat loss.

For the place where there is a forest clear without canal it was mapped by walking along the forest clear. So the width was not simulated and the track itself transformed into a polygon and the area was obtained.

Right Canal

Total area cleared estimated for the Right Canal (from Nandhipalli upto Yerraballi Forest Block including the cleared forest area without canal) is 114 ha. (Table 1). The second part of the

Table.1 Details of area cleared for the canal construction, length of the canals and details of the loss of the potentially suitable habitat of the Jerdon's Courser in and around Sri Lankamaleswara Wildlife Sanctuary and Sri Penusula Narasimha Wildlife Sanctuary, Cuddapah District, Andhra Pradesh.

Sl. No.	Sri Lankamaleswar WLS	Areas in hectares	Length in Km
1.	Estimated area cleared for the Right Canal.....	114.0	
2.	From Nandhipalli to Anandanagaram.....	53.0	
3.	From Kothacheruvu to Yerraballi Forest Block (YFB).....	51.5	
4.	Forest clear without canal near YFB.....	9.5	
5.	Loss of potentially suitable habitat from Kothacheruvu to YFB.....	15.0	
6.	Loss of potentially suitable habitat in the Forest clear near YFB.....	7.0	
7.	Total loss of potentially suitable habitat due to the Right Canal Construction.....	22.0	
8.	Total Length of the Right Canal in and around the Sri Lankamaleswara WLS.....		13.0
9.	From Nandhipalli to Anandanagaram		5.8
10.	From Kothacheruvu to YFB.....		5.6
11.	Length of the Forest cleared in and around YFB.....		1.6
Sri Penusula Narasimha WLS			
1.	Estimated area cleared for the Left Canal.....	163.0	
2.	Area cleared inside the Muthukur Forest Block.....	4.5	
3.	Total Length of the Left Canal in and around the Sri Penusula Narasimha WLS.....		23.0
4.	Length of the Left canal inside the Muthukur Forest Block.....		2.0

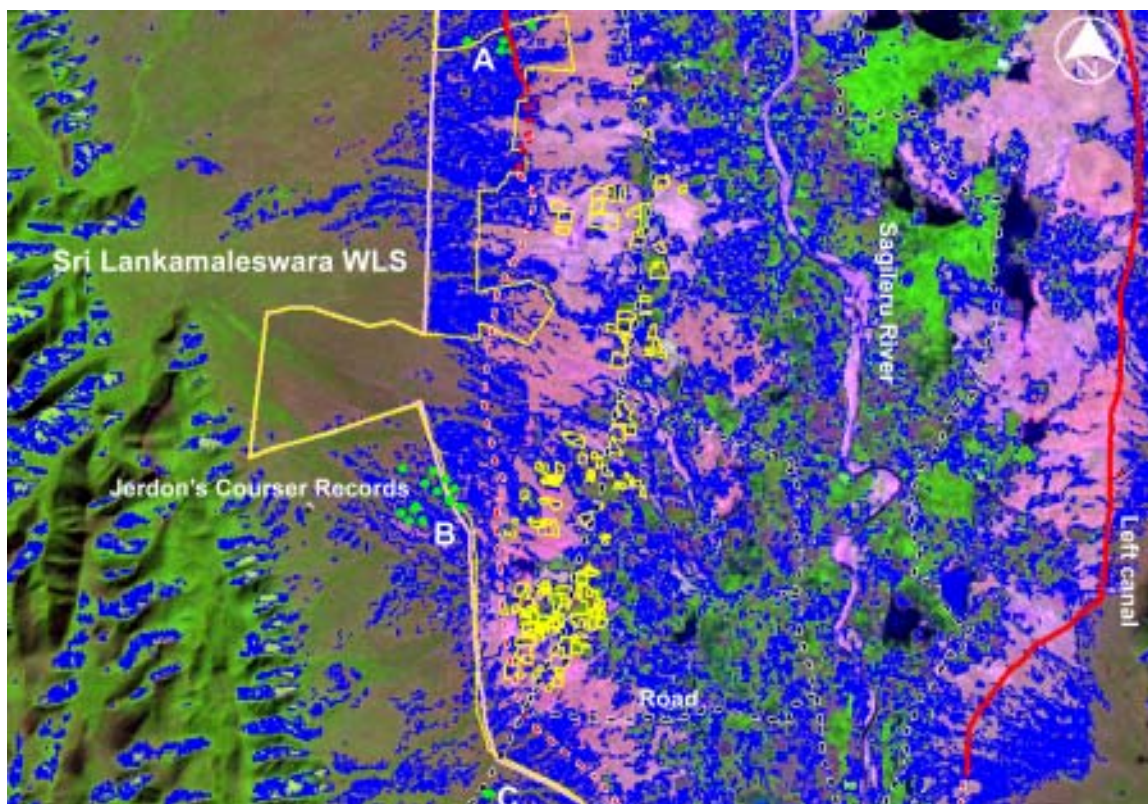
right canal which is from Kothacheruvu to Yerraballi Forest Block has already destroyed c.15 ha. of potentially suitable habitat of Jerdon's Courser. It has also destroyed one of the places where Jerdon's Courser was recorded in 2001 by means of footprints, direct sightings, and calls (Plate 3 & 4). Apart from this, area cleared for the canal construction near Yerraballi Forest Block previously had c.7 ha of potentially suitable habitat (Plate 5). So in total c.22 ha of potentially suitable habitat of the Jerdon's Courser was lost due to this canal construction in the eastern part of the Sanctuary (Table 1).

Proposed route for the canal construction goes along the Sanctuary boundary and ends near Atlur Road Junction. More alarmingly this canal route passes within about 500m of the sites from

which there are recent records of the Jerdon's Courser.

As well as when the proposed canal reaches its 40th km it goes very close to the place where the Jerdon's Courser has been sighted regularly right from 1986. Scrub jungle in and around this area is the only place where Jerdon's Courser has been sighted frequently, footprints obtained and calls heard regularly. **This is the only place in the world at the moment where the Jerdon's Courser is known to be present at almost all times.**

It was estimated that if excavations for the proposed canal progress further they will destroy c.50 ha of suitable habitat of the Jerdon's Courser around the Sri Lankamaleswara Wildlife Sanctuary (Map 7).



Map. 7. shows Landsat 7 ETM image of the study area with the preliminary habitat suitability map overlaid onto it. Green dots with A, B & C marks indicates recent Jerdon's Courser records and Red dotted line indicate the proposed route of the canal. Yellow lines indicates the lemon farms. (Map not to scale).

Left canal

Total area cleared estimated for the construction of the left canal in and around Sri Penusula Narasimha Wildlife Sanctuary is c. 163 ha. Forest area cleared inside the Muthukur Forest Block is c.8 ha. (Table. 1) Except for this Muthukur Forest Block this canal route passes very close to the sanctuary boundary. Extensive favorable habitat is present at the foothills of Turupukonda in the Cuddapah Forest Division.

Other observations

During our recent survey near the construction site of the canal it was observed that illicit woodcutting was rampant (Plate 6). Roads were prepared not only along the canal route but also from the main roads to the canal. This is mainly to access the canal site from the main road for bulldozers and excavators. Invariably these roads were constructed from the near by villages. This facilitates access for local people to the forest area for unauthorized woodcutting, mainly by tractors and bullock carts. The Sri Lankamaleswara Wildlife Sanctuary is also known to have Red sanders

(*Pterocarpus santalinus*), the valuable timber tree sought after by illicit woodcutters. Andhra Pradesh Forest Department records from 1984 to 2003 shows that 116244 kg of matured Red sanders woods has been seized from the smugglers. It should be noted that this figure is only for Cuddapah Forest Division. It clearly shows that there is a lot of pressure from smugglers on mature Red Sanders trees in this division. It is apparent that the roads constructed for the canals construction would make commuting easy for the illicit woodcutters.

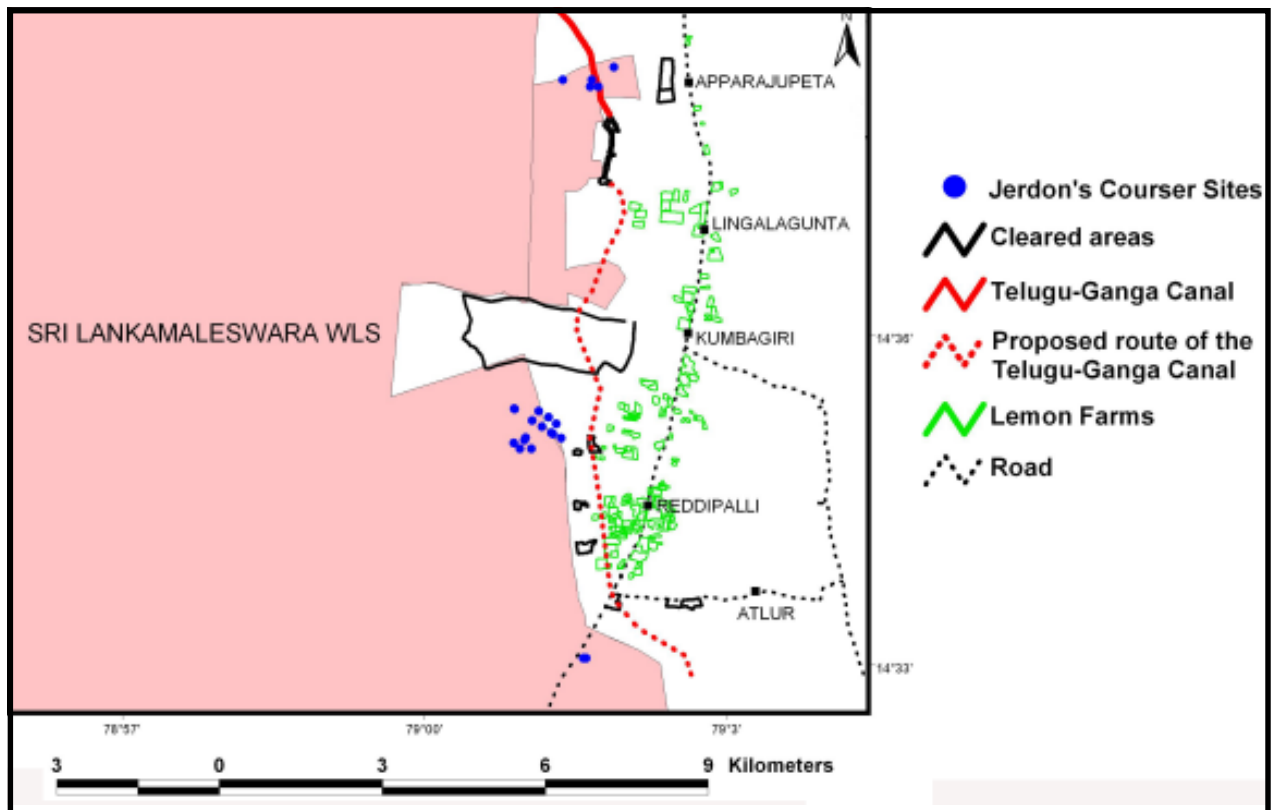
Apart from possessing the critically endangered Jerdon's Courser, two sanctuaries is also harbors threatened vertebrates such as Leopard (*Panthera pardus*), Wolf (*Canis lupus*), Wild dog (*Cuon alpinus*), Sloth bear (*Melursus ursinus*), Four-horned antelope (*Tetracerus quadricornis*) and, Malabar Giant squirrel (*Ratufa indica*). Also 122 birds species were recorded in SLWLS and 50 birds were recorded from the western part of the SPNWLS from 2001 (Jeganathan & Rahmani *in prep*).

Conclusion

The new canal poses at least three types of threat to Jerdon's courser.

1. Construction will destroy the remaining scrub jungle habitat of the Jerdon's Courser in the eastern part of the Sri Lankamaleswara Wildlife Sanctuary. Furthermore, because population survey work is at an early stage, other Jerdon's courser sites where the species has not yet been detected will also be destroyed. These losses of habitat will diminish the population. Absence of Jerdon's Courser records does not imply absence of the bird, as most of the areas outside the Sanctuary have not been surveyed yet. So, it is imperative to protect the potentially suitable habitat outside the Sanctuary.

2. The canal will permit the extension of irrigated agriculture to many areas outside the Sanctuary that are scrub jungle at present. Rapid replacements of forested landscapes by cultivated lands along with the change in cropping pattern has deteriorated the Jerdon's Courser's habitat. Major crops of this place were paddy, cotton and sunflower. But in recent times, these have been replaced by sweet lime and lemon farms as they need relatively less maintenance, and are lucrative. This has resulted in the clearing of the scrub jungle areas outside the Sanctuary. Scrub jungle will be cleared for this purpose and this will remove Jerdon's Courser habitat and diminish the population. Scrub jungle has already been cleared for agriculture up to the Sanctuary boundary in several places since 2001 (Map 8).



Map.8. shows the proposed route of the Telugu-Ganga Canal and other cleared areas (mapped from 2001-04) in and around the Sri Lankamaleswar WLS. Note that all the cleared areas mainly for lemon farms falls very close to the sanctuary boundary as well as to the Jerdon's Couser sites.

3. Extension of agricultural use will lead to increased human activity in and near the Sanctuary. In turn, this is likely to increase unauthorized human use of the Sanctuary and any remaining scrub jungle outside it. All known Jerdon's Courser sites are already used for grazing of livestock and woodcutting, but at moderate levels which may help to maintain a suitable vegetation structure for Jerdon's Courser (Jeganathan *et al.* 2004a). However, increased use is likely to reduce the density of bushes below that suitable for the species. Other unauthorized uses of the Sanctuary include hunting of mammals and bird trapping. An increase in trapping is likely to lead to direct killing of Jerdon's Coursers.

We conclude that the only known population of Jerdon's Courser in the world will have its already precarious conservation status made much worse by the construction of the canal around the Sri Lankamaleswara Wildlife Sanctuary.

Recommendations

1. Construction of the canal should be suspended immediately around the Sri Lankamaleswara Wildlife Sanctuary, pending a review of its impact on the Jerdon's Courser. If an environmental impact assessment has already been carried out it was clearly inadequate because BNHS data on the distribution of the species and its habitat were not consulted as well as permission from the Andhra Pradesh Forest Department was also not obtained for the canal construction and to clear the forest.
2. There should be a management plan for all known Jerdon's Courser sites and apparently suitable habitat in the Sagileru valley, to be implemented urgently by the Andhra Pradesh Forest Department. The plan must include protection from clearance of scrub jungle outside the present boundary of the Sanctuary, measures to limit, but not exclude, grazing and woodcutting, and measures to prevent hunting.
3. Cleared area, around the Yerraballi Forest Block, and Muthukur Forest Block should not be allowed to do any agricultural practices. Because there might be a chance of encroachment by clearing more forest areas, so it would be better if these places are patrolled or monitored continuously.
4. If there is a plan for diverting the canal elsewhere, APFD and BNHS must be informed beforehand and consulted for conducting the proper EIA.

Plate.1. Telugu-Ganga Canal inside the Yerraballi Forest Block near the Sri Lankamaleswara WLS. Canal stopped after 130m from this point since action taken by the APFD. 33.300 marks the length of the canal (in km) from its origin.



Plate.2. One of the Forest cairns destroyed in the Sri Peninsula Narasimha WLS boundary. Several forest cairns were damaged all along the sanctuary boundary.



Plate.3. Footprints of the critically endangered Jerdon's Courser recorded in one of the soil strips deployed in the Yerraballi Forest Block near the Sri Lankamaleswara WLS.



Plate.4. Canal runs through now in the very place where the Jerdon's Courser was recorded in the Yerraballi Forest Block near the Sri Lankamaleswara WLS. Note that the GPS points B9S12.



Plate.5. Forest clear in and around the Yerraballi Forest Block near the Sri Lankamaleswara WLS. Nearly 7ha of the suitable habitat of the Jerdon's Courser was lost due to this clear.



Plate.6. Roads along the Telugu-Ganga Canal would pave way for more illicit woodcutting in and around the Sanctuary area.



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